

# **An Analysis of Intragenerational Mobility and its Determinants in Rural Pakistan**

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**Dedicated to**

I would like to dedicate my thesis to my Papa and Mama

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## **Abstract**

This study is an attempt to analyze household income dynamics for rural Pakistan using longitudinal data from PRHS 2001 and PPHS 2010 conducted by Pakistan Institute of Development Economics. Income mobility was studied in absolute and relative aspect using Shorrocks' Index and Transition Matrix approach respectively. Moreover, convergence was tested through regression analysis. Households with the lowest reported base-year income experienced the largest absolute income gains. Households which had lowest predicted base-year income experienced gains in incomes. This suggested that the growth was pro-poor during the period under study. Convergence was seen to hold in the observed period and structural or macroeconomic changes that favored initially poor households were dominant over the phenomenon of cumulative advantage, poverty traps, and skill-biased technical change. Through regression analysis, demographic and economic variables were found to be important determinants of mobility. Change in the demographic variables was also accounted for because of rapidly shifting household boundaries. Consequently, changing household size and share of children was found to significantly affect changing income.

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## *Chapter 1*

### **Introduction**

Per capita income, poverty, inequality and polarization hold great importance as being important economic indicators to study the wellbeing of individuals. They have always been a concern to policy makers because they not only give the view of how much income is there but how this income is distributed among all the individuals. Income inequality has long been considered to be an important parameter to measure poverty (see for example, Atkinson, 1987; Gottschalk and Moffitt, 1994; Gottschalk and Smeeding, 1997). Policy makers have long tried to look upon the measures of inequality to deal with issues like poverty and injustice, increase welfare of the society and make policy decisions like the imposition of progressive income taxes, the taxes on capital gains, and minimum wage adjustment. However, as inequality is measured on a snapshot in time with income of a single year taken to analyze the phenomenon, an increase in static inequality and in turn poverty may not prove to be a footstep for a long term increase in inequality (leading to higher poverty) if it is escorted by high income mobility (Shorrocks, 1978; Atkinson, Bourguignon and Morrisson, 1992; and Fields and Ok, 1999). This realization of the importance of looking in the dynamic perspective gave birth to the concept of income mobility which tracks the income movements of the individuals on absolute or relative scale taking into account the income of more than a single year. Although there have been a great deal of work done on income inequality, income mobility studies are more limited and ad hoc (Fields and Ok, 1999).

“Income mobility” and “income inequality” are two distinct but correlated concepts according to various analysts. While inequality is about measuring the dispersion of income in any given period of time, mobility tracks the movement within the distribution of individuals or households between two time periods. So when income mobility takes place it leads to a change in the overall inequality of the population (Gottschalk, 1997). In the long run high mobility levels out rich and poor thus increasing equity (Aaberge et al., 2002). Jarvis and Jenkins using Shorrocks index (1998) marked that an increase in income mobility results in smoothing of transitory variations in income, as a result of which permanent inequality lessens and becomes more tolerable. Hence, it is important to study the dynamic concept of income mobility which may help the individuals to improve their economic status through their actions. This emerging idea that income must be taken in a dynamic perspective, completes the picture of welfare parameters to be analyzed.

Income mobility studies have gained a lot of attention these days due to its important role in the formulation of policies. Income mobility is defined differently by different people. Atkinson, Bourguignon and Morrisson (1992) and Fields and Ok (1999a) have provided their definitions of income and earning mobility where income is defined as income from all sources while earning is defined as the income earned only from labour market. One attribute of mobility on which all analysts agree is that it is the measurement of income the recipients receive at two or more points in time and these recipients move through income distribution over time where the “income distribution” is defined as the entire vector of incomes. Fields (2001) proposed that “economic mobility studies are concerned with, for example, quantifying the movement of given recipient units through the distribution of economic well-being over time, establishing how dependent one’s current economic position is on one’s past position, and relating people’s

mobility experiences to various influences”. Therefore, distributional dynamics are categorized into two types. These are shape dynamics and intra-distributional mobility. Shape dynamics is cross-sectional analysis analyzing the change in the external shape of the distribution and dealing with limited economic issues like cross-sectional inequality, income polarization, or poverty incidence. Intra-distributional mobility, on the other hand, looks at the change between distributions. The two aspects are orthogonal, requiring different types of data, and dealing with different economic questions.

This study is an attempt to analyze how the individuals have performed in terms of their income changes. Intragenerational mobility is studied by looking at the incomes of the same households between two time periods i.e., 2001 and 2010. It is important in order to know the effectiveness of the policies in the eradication of poverty and improvement of economic status of the individuals during the period under study particularly when rural areas are considered.



## **Objectives of the Study**

This study is carried out to analyze the intragenerational mobility on absolute and relative scale.

The specific objectives of the study are to find out:

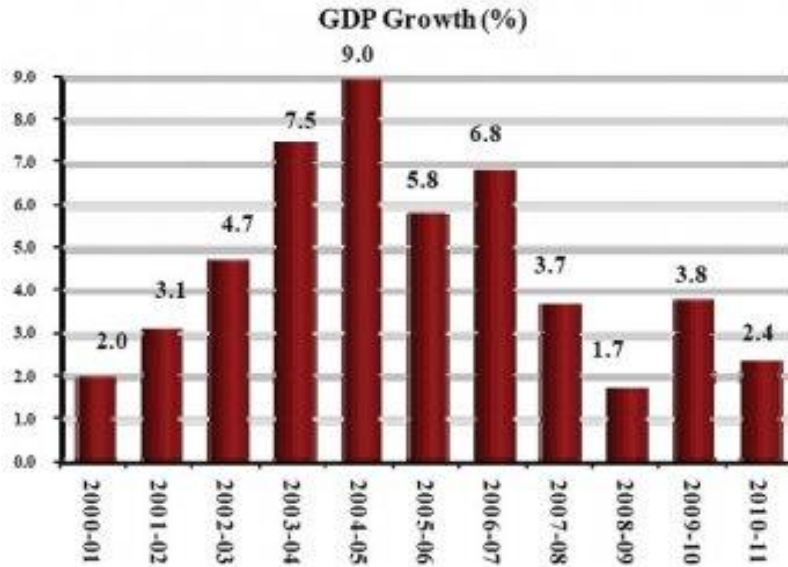
- I. How much absolute and relative income mobility has taken place during the period 2001-2010?
- II. How much income mobility is related to income inequality?
- III. How demographic and economic events have their influence in income mobility?
- IV. Did households with higher base year incomes experienced lesser or greater income gains, on average, than those who has initially low-incomes?

## **Significance of the Study**

As most of the canonical models of income like permanent income hypothesis are dynamic so there is a need for dynamic analysis of welfare. Similarly, life time equity is determined by upward and downward movements in the distribution. The increased availability of longitudinal datasets has provided the incentive to analyze the income histories for the purpose of the formulation of welfare programs and other policy related research areas. A cross-sectional analysis is not viable to be applied to the welfare analysis which may exhibit the highly mobile economy on the same level of welfare as a perfectly persistent one. Consequently, it will be unable to reveal the value judgment of people of two different societies e.g., a society may be more better off because it is highly mobile– for instance it has perfect insurance and credit markets and thus has a smoothed consumption pattern– than with permanent inequality and long term poverty.

Most of the developing countries do not have sufficient work done on income mobility due to unavailability of relevant data. However with the availability of longitudinal data sets more and more income mobility studies are produced in order to analyze the income status of the individuals on absolute as well as on relative scale and to get know-how of the status of a society. This type of analysis holds importance because it gives an idea of what has happened economically to individuals in a certain period. How well or worse they have influenced by certain economic policies and whether they have been able to improve their standard of living. Moreover, how different variables affect income and what are the most effective factors in

bringing a positive change in incomes. In Pakistan also income mobility analysis is a grey area which needs to be focused on. According to World Bank report, the percentage of the people living below the poverty line in Pakistan fell from 34.5 percent in 2001-02 to 17.2 percent in 2007-08. In rural areas, it declined from 39.3 percent in 2001 to 20.6 percent in 2007/08. Governments have taken several measures to eradicate poverty like food support programs, income support programs and emergency relief packages. Moreover, Pakistan has experienced a healthy GDP growth rate during the period at least up to 2006-2007, as shown in the fig.1. A huge literature uses cross-sectional regressions on the determinants of economic growth at the country level (Levine and Renelt, 1992; Barro and Sala i-Martin, 1997; Benhabib and Spiegel, 2000). However, the focus in these studies is mainly to find out what are the determinants of aggregate income other than analyzing changes in the economic condition of households. Questions which are less discussed, are: like who is getting ahead? Who is lagging behind? Who is standing still and why? These questions hold importance because poverty eradication has always been the top most goals of the governments and several steps have been taken to achieve this goal. The more the benefits of economic growth go to initially wealthy households at the expense of the poor, the greater the importance of policies that redistribute income to benefit the poor. This study uses panel data for the period 2001-2010 to see how economic positions of the households have changed and how well the economic status of initially poor households was fared relative to their wealthier counterparts during the period under consideration.



Source: Economic Survey of Pakistan

While studying mobility, it is important to keep in consideration the intergenerational and intragenerational aspects of mobility and the unit of measurement in which it is studied i.e., household, family or individual. In the study of intergenerational mobility, comparison of income between past and present generations is made with the recipient unit being the family, specifically a parent and a child while in intragenerational mobility comparison of income for different periods of the same generation under study are made and it finds out how much current income depends on lagged income. The recipient unit is the individual or household at two different points in time. In Pakistan, we have found only a small number of studies in the area of income mobility have provided a comprehensive review of intergenerational mobility (Havinga *et al.*, 1986; Sajid and Irfan, 2012). However, no study is found measuring intragenerational mobility in Pakistan. This study is an attempt to look thoroughly at the intragenerational concept of income mobility which is important to be analyzed to deal with major issues pertaining to the society i.e., poverty and inequality. The focus is on rural Pakistan which comprises of a good 63% of the total population of the country living in rural areas according to Economic Survey of

Pakistan 2010. The unit of analysis is household as income is mostly shared between the members of the household. So this analysis can provide a comprehensive picture of what is going on in terms of economic status of the individuals in bucolic areas. The data used is Pakistan Rural Household Survey 2001 and Pakistan Panel Household Survey 2010 which are conducted by Pakistan Institute of Development Economics and covers 16 districts in four provinces of Pakistan Table-1

Income mobility analysis can be made on absolute as well as on relative grounds like absolute and relative poverty. In absolute mobility like absolute poverty, the change in real incomes of households or individuals over time is studied. Hence, if the incomes of all the individuals in the distribution increase then there is occurrence of mobility according to absolute mobility concept. Absolute Mobility is an independent idea and it can be found by looking at the income distribution of a single individual. It can be affected by increase in economic growth, increase in income due to aging, change in inequality of the income and by change in relative mobility. In relative or rank mobility the wellbeing of household or individuals is measured relative to others during base and final years when the income is divided into quintile, decile or centile etc. It looks at the movement of the individuals between quintile, decile, centile, or rank from base year to final year. These relative movements describe how better off or worse off the households or individuals have become when compared to others in the given time period. In relative mobility, the change in mean income is ignored and remaining change is taken into consideration. Transition matrix is a measure commonly used to measure relative income mobility which was first the work of Schiller (1977). In our analysis we have calculated both absolute and relative mobility in order to capture a clear picture of what was going on within the society in terms of their economic status from the period 2001-2010. The question as whether those are the rich or

the poor who have been benefitted most in terms of their incomes is tested in case of rural Pakistan. This is important in order to find out how much government policies have been effective and conducive in the reduction of poverty through its policies. Moreover, the importance of different demographic and economic factors is analyzed in the determination of changing incomes. The framework for studying mobility (see for example Woolard, 2007 and Field, 2003b) is applied to equivalised household expenditures to measure the degree of mobility observed between 2001 and 2010 for rural households of Pakistan. Expenditures are taken equivalent to income. In order to cope with the possibility of measurement error, instrumental variable technique is used to predict expenditures of the base year (Field 2003). Using a regression of household adult equivalent expenditure on household size, demographic structure, education and age of household head, land and other asset ownership, and the share of employed members of household, household expenditures for 2001 were predicted. Consequently, analysis was done based on these predicted incomes (Woolard and Klasen, 2007). Although these regressions will not capture the whole scenario but will give the sense of maximum extent to which measurement error affects expenditures.

## *Chapter 2*

### **Literature Review**

Income mobility research got attention in 1960's and has been a subject of research internationally in recent decades because of its importance in analyzing how individual get better off, worse off or unchanged in terms of his/her economic status through time or through generations. Because of availability of data income mobility studies began mostly in developed studies followed by developed countries and a lot of work on mobility is carried out now a days.

Schiller (1977) used the transition matrix approach for the first time using Longitudinal Employer Employee Data (LEED) for United States to study intra cohort income mobility. The focus of the study was particularly earning mobility. Employed males were found to experience relatively large earnings mobility both across and within age cohorts proving that individual earning profiles experience large variations and support those labour market models which predict such variation. 70% of the employed males moved averagely one-fifth across the earning distribution of their age cohort. Moreover, black males were found to be less mobile forming immobility pockets which marked the presence of at least a little selective segmentation. Besides this income mobility was observed within age cohorts and across lifetime.

Jarvis and Jenkis (1995) used first two waves of British Household Panel Survey (BHPS) to analyze the dynamics of income mobility and poverty in Britain with particular focus on the poorest. They concluded that income mobility was experienced by all income groups in the reference period but it was mostly observed as short range. Correlation coefficient results revealed mobility to be about 0.7 percent. Shorrocks immobility index using Gini index was also used which showed the value of 0.93. Moreover decile mobility matrix were used to measure

relative mobility showing that two third of the sample showed stability by remaining in the same decile group or moving up or down one decile group. Moreover about 16% people showed downward relative mobility and 11.6% revealed upward income mobility.

Schluter (1996) studied the intragenerational income mobility for Germans using GSOEP. Transition matrices were used to study income mobility. The study suggested a greater level of income inequality resulting from a fall in income mobility. Largest changes were observed in the incomes of the poor while middle income groups experienced fairly stable income level. Overall economic scenario of income profile was fairly mobile. Several mixed Markov chains were used in discrete time and a non-stationary mover- stayer model was used. Particular focus was made on the mobility profiles of the poor instead of the whole transition matrix. The probability of staying poor was mostly 0.55 between two consecutive periods. While the probability that the people will stay in the second richest group was 0.7 while for other income groups it was 8.

Canto-Sanchez (1998) used the longitudinal data to study income mobility for Spain for the period 1985-1992. Results of the study proved that while transitional inequality was large, there was a tradeoff between income mobility and inequality in the long term. Income was found to be more stable at the top than at the bottom of the distribution. Adult Household equivalent income was used to calculate income mobility in Spain using various measures i.e., correlation coefficient and Shorrocks Index. Using the Gini coefficient, the effect of income mobility on income inequality for the two years was found to be relatively small compared to when their criteria was used for the measurement of Shorrocks Index. When studied in terms of degree and pattern of mobility, the degree of mobility was found to be higher, i.e., around 60% of the households changing their decile in one year period where as the pattern of mobility was rather small, only 14% of households changed more than two deciles in a year time.



Aaberge, Bjorklund et al (2002) used data for the years 1980-1990 to make a comparison of income inequality and income mobility in Scandinavian countries with U.S. Three income concepts of mobility are studied: individual earnings, family market income and family disposable income. Shorrocks index using Gini coefficient as a measure of inequality was used to measure mobility. United States was found having a higher level of inequality than Scandinavian countries even when the accounting period was extended from one to eleven years. The pattern through which the mobility changed was however surprisingly the same, i.e., there was proportionately similar reduction in equality even when accounting period of income was extended. Relative income changes which were related to changes in marital status and labour market in all the four countries had the greatest magnitude of change in United States. Analysis was made separately for 1980-1990 and 1986-1990 period. Using Shorrocks approach using the Gini index, no evidence was found to prove of a positive relationship between inequality and mobility.

Scott and Litchfield (1994) studied income mobility and inequality from the period 1968-86. The author used transition matrix to calculate mobility. The analysis revealed that half of the individuals experienced movement to a higher income class and 26% of them moved to lower income class. Income mobility was found to be higher in the individuals who were initially poor. However the change in income class was not far beyond their initial status. The author also determined the factors behind these directional movements using linear regression model and an ordered logit model. The variables which were important in mobility were age and education of the household head, amount of land owned, and per capita household income in the base year.

Gregg and Vittori (2008) made a comparison of the income mobility in four European countries, Denmark, Germany, Spain and the UK. Using different measures of mobility mainly which

relate to inequality like Shorrocks based indices and the Schluter and Trede approximation, the author made an attempt to find the extent of mobility at various segments of the earnings distribution and tried to find out how mobility is going to relate to permanent inequality. Globally, short run and long run analysis revealed that mobility has reduced the level of permanent inequality. Averages of the years 1994 and 1995 were compared with the average of 2000 and 2001 showing that Denmark has experienced highest mobility while Germany has experienced the least mobility as a whole. Using Gini Index for the measurement of inequality, there has not been found a significant correlation between mobility and inequality. Decomposability index was further implied on earning quintiles to find out that the bottom 20% of the distribution was the largest contributor to the global mobility.

Bogomolova and Tapilina measured income mobility in Russia for the first time using Russian Longitudinal Monitoring Survey (RLMS) during the phase of economic transition in 1990's. Relationship of income mobility to income inequality was explored. Kaplan-Meier survival function was used to find that initial income class played a positive role in the determination of mobility. Over 60% of Russians were found to be in a "highly unstable situation" in terms of relative mobility. Moreover, logit and probit models were used to find the impact of wages and households socioeconomic characteristics on income mobility. Macroeconomic influences particularly wage arrears dynamics were found to be the most important cause of upward and downward wage relative mobility.

Beenstock measured mobility and long term inequalities in earnings in Israel using individually matched census data for 1983-95. Earnings was differentiated between current, longitudinal, permanent and life-cycle earnings. Income leveling effects were also analyzed. Gini index was used to measure inequality in earnings in Israel. Income mobility was computed and compared to

U.S which showed that income mobility in Israel was greater than U.S in the period under study. In the case of earnings in Israel the degree of overstatement of inequality in horizontal studies was about 15%. Inequality and mobility were measured for various levels of time aggregation. Finally, the change between 1983 and 1995 was decomposed into within-group and between-group contributions.

Lippman and Thomsson analyzed Income Mobility of natives and immigrants in Sweden using the database LINDA comprising of 600000 individuals during the periods 1980-84 and 1992-96. The estimates using transition matrices gave the picture of greater income mobility for immigrants compared to natives during the years 1980-84. However, the gap between the income mobility of natives and immigrants decreased during the two periods under study hence leading to only a small gap in years 1992-96. In terms of absolute mobility there was found an increase in mobility in all the sectorial and demographic groups of both immigrants as well as natives during the transition years between the years 1980-84 and 1992-96. However in relative terms, natives experienced higher income mobility than immigrants. The relative difference between the income mobility of natives and immigrants was mainly on the part of males since no difference was found for women between natives and immigrants.

Wodon (2001) analyzed income macro mobility and risk in Argentina and Mexico throughout the business cycle. He used Gini index which is a function of the covariance between individuals' incomes and their income ranks. Time dependence which was analyzed through Gini was higher in Argentina during recessions and lower during growth when it was compared to Mexico. The main reason being the Mexican labor markets deal with recessions through price adjustments (i.e., real wage cuts). Conversely, Argentinean labor markets deal with it through layoffs. This laying off lead to changes in incomes of the individuals and their ranks in the

earnings distribution. As a result Argentina experienced less time-dependence in ranks during recession of its economy. Furthermore, young uneducated workers experienced less time-dependence than the rest of the population.

Cunningham and Maloney (2000), Maloney et al. (2004), and World Bank (2004) focused on vulnerability and the distribution of income shocks in Mexico. In particular, they studied the conditional earnings mobility distribution, where the conditioning factors are a set of socioeconomic variables. The periods covered by these studies included before, during and after the 1994 Peso crisis, as well as 1998-2002. The authors found a substantial amount of heterogeneity in the distribution of shocks across population groups. They also found that, holding everything else constant, the least educated and poor suffered slightly less in terms of earnings changes during the 1994 Peso crisis, but probably at the cost of having to add other members of the household to the labor force. Finally, the authors showed that the structure of the determinants of earnings changes was quite stable regardless of whether the economy was in recession or not. One difference was that during recessions, more educated households experienced larger earnings losses than less educated groups in the population, holding everything else constant. However, World Bank (2004) reached somewhat different conclusions when analyzing consumption shocks, using the PROGRESA dataset to evaluate poverty alleviation between 1998 and 2000. Less educated households in rural areas seemed to suffer greater shocks than the more educated ones.

Jenkins and Kerm (2011) used the British Household Panel Survey for the period 1991-2005 to assess the income growth of the individuals by making the comparisons of the changes in the income for various income groups for example comparing the rich and the poor and by comparing income values like quintiles. These changes in the income group or the quintiles were

witnessed by studying income mobility. Longitudinal data was used to keep the track of income changes of the same individuals and to summarize income growth patterns. Various dominance conditions were developed and indices were calculated to compare the income growth distributions of individuals. Cumulative Income Mobility profiles were calculated through Robust Locally Weighted Regression (LOESS). Bootstrap resampling methods were used for statistical inference that considers dependent clustered samples. Results suggested progressive income growth. However, there was pro poor income growth in earlier years of Labour government compared to earlier period of Conservative years.

Fields and Puerta 2008 used panel data from 1996 to 2003 to analyze earning mobility in urban Argentina. The study focused on who gained and who lost the most when the economy grew and contracted respectively. They found that contrary to the belief that there is divergent trend in mobility, it was found to be mostly convergent and sometimes neutral. However, there was no sign of divergence in mobility. Through panel data analysis it was found that mobility was pro poor which was contradictory to the results of cross-sectional comparisons of inequality. Five tests were performed to compare cross-sectional and panel changes for the same set of individuals. It was found that sometimes there were very large changes in earning income of the individuals who were followed overtime that could only be tracked through longitudinal analysis and this fact reconciles the inequality and mobility concept.

Fields (2003) studied income mobility of Indonesia, Spain, Venezuela and South Africa using longitudinal data. The study found a greater change in the absolute income of those individuals who were initially poor. The individuals with low income were found to be experiencing gains in terms of income at least as much as their rich counterparts. So in all the cases except one there was no strong evidence of the existence of poverty traps, cumulative advantage and skill biased

technical change rather macroeconomic and structural changes were found to be favoring the initially poor households.

Fuwa (2006) studied data from the period 1994-1992 for Phillipine village to study socioeconomic mobility. Until earlier 1980s the exit from poverty was majorly attributed to macroeconomic growth. During post 1980 periods “agriculture ladder” became less important in helping an exit from poverty and other variables like schooling and “labour endowment” plunged in to occupy important place in helping the poor strata get out of poverty. To a surprise, no evidence has been found that there is state dependence in poverty spells.

Beccaria<sup>1</sup> and Groisman (2008) studied income mobility and inequality in Argentina from 1988 to 2001. Panel Data for Buenos Aries was used which is the capital of Argentina and comprises of nearly one third of the population in the country. The study therefore aimed to explore how increased inequality caused a change in average incomes in the distribution in Argentina from mid-eighties to 2001. Income Convergence Hypothesis was also tested using dynamic pseudo-panel for the period 1984-2005. The results of the analysis proved occupational instability to be a cause of an increase in the variability in incomes in the mid-nineties despite macroeconomic stability during the whole decade of nineties. The study proved the presence of income mobility and increase in inequality in the income distribution as providing the justification for the changes in the distribution of permanent incomes. Small long term income mobility was also proved. The study supported the phenomenon that the inequality in Argentina was majorly due to instability of the labour market.

Grootaert and Kanbur studied how there was change in distribution of income in Cote d’Ivoire during late 1980s. The panel data set used was CILSS which allowed studying mobility across different poverty classes over time. The unit of analysis was household per capita income. The

study revealed that for two period panel data, poverty was less than what was shown in cross-sectional analysis. There were few lucky individuals who experienced positive changes in income during the two periods when the overall economy was declining. A detailed study of the matter further revealed that these lucky few were large in number and even the poorest showed high probability of change in poverty. These lucky few had large regional distributions. Moreover in some socioeconomic grouping these were poor who had better chances of escaping poverty.

Shi, Liu et al. (2010) measured household income mobility in rural China for the period 1989-2006 using data from China Health and Nutrition Survey (CHNS) database through multivariate regression and decomposition analysis. Higher income mobility was observed in the households who were having lower level of initial income, high share of wages in income, higher level of education, high number of members in non-agricultural occupations and those with younger heads. Among these the most important variables that accounted for higher income mobility were increase in the wage income shares, increase in non-agricultural employed household members shares, and increased level of average year of education of household members. As a result emphasis on non-agricultural employment and education was found critical to increase the level of income of rural households.

In case of Pakistan a few studies can be found on intergenerational mobility. A pilot study by Havinga, Mohammad and Cohen (1986) computed intergenerational mobility and change in socioeconomic conditions of the people from one generation to another. Primary data used in the study comprised of 1200 respondents from 10 major industrialized cities of the country. The unit of analysis was individual as well as family and the analysis was intergenerational as well as

intragenerational. Income and wealth status of the people from different generations was analyzed considering their possessions like their social, human and capital status and other characteristics. The analyses had resulted in the estimates that the dispersion of wealth was considerably higher than that of income among individual sons. When comparing mobility for individuals and families it was found that mobility was higher at family level. However there was a slight increase in the wealth mobility indicator.

Shehzadi, *et al.* (2006), used a small survey and focused on how intergenerational income mobility is related to the development of children in Faisalabad, Pakistan. The key objective was to find out the factors responsible for intergenerational mobility and how this mobility was related to development of children. 160 respondents were selected through multistage sampling technique. Income mobility was found to be significantly related to education of the children.

Sajid and Irfan 2012 studied intergenerational mobility by descriptive analysis using transition matrix to analyze the positions and ranks of individuals and regression analysis to study the impact of parents' income on sons' income. The results revealed that the socioeconomic status of father was an important determinant of son's status with the probability of retaining the same economic status being 43.5 percent. Education was found to be an indicator of Poverty trap with sons attaining the same education status as their parents. Income mobility was found to be sensitive to cohort of sons' generation. It was found that there was higher intergenerational income mobility when earnings at the later stages of life were considered which confirmed the life cycle bias.

Although there have been extensive literature on mobility internationally, but still it's not a widely measured phenomenon due to unavailability of longitudinal data which is not available in many countries. In Pakistan also, although vast literature can be found on poverty, its dynamics



and inequality there has been no study found in the context of intragenerational mobility. This study is an attempt to measure intragenerational mobility in rural Pakistan for the period 2001-2010.

## *Chapter 3*

### **Theoretical framework**

An important conclusion which can be drawn from the literature is that ‘mobility is multi-faceted’, (Fields, 2006) and it is that trait due to which it is not possible to formulate a single fundamental axiom that can encompass all the axiomatic enquiries that are related to mobility measurement (Fields and Ok, 1999b). So the analysis of mobility depends on preferences in terms of theoretical reasoning. Increased income mobility can lead to a fall in inequality with extension of time period if certain restrictions are applied to the social welfare function. Furthermore, if total income of the time period is considered the only dependent variable in the social welfare function, welfare increases with income mobility. Hence higher mobility can be socially desirable as a means of providing lower income group an opportunity to enter into higher income groups. Conversely, risk averse people prefer income stability so it may prove to be socially undesirable as it can be a reason for greater income fluctuations while, other things being equal. Shorrocks (1978) derived a social welfare function that did not lead to increases in welfare with an increase in income mobility.

Several theories provide conceptual framework to changing household incomes. One which often comes in discussing income dynamics is the theory of cumulative advantage which posits that individuals having higher incomes on the first hand will be benefitted later by having higher incomes. Richer households are able to borrow and save more, have larger physical and capital assets and have political and social connections which collectively lead them to generate higher income (Huber, 1998; Boudon, 1973; Merton, 1968). Another supporting theory of poverty trap says that the people who are less advantaged and poor have lower human, physical and social

assets and have lower income which entraps them into poverty. Poverty and low assets become the reasons to cause each other. Nobel-Laureate James Meade (1976) called these processes as self-reinforcing influences helping to retain the good and bad fortunes of the fortunate and the unfortunate.

Labor market twist is another phenomenon which supports the theories of poverty trap and cumulative advantage. This idea has emerged from the phenomenon that with increased level of globalization and technological advancement, the demand for labor has outpaced the supply leading to a rise in the earnings of those who are skilled and fall in the earnings of unskilled individuals (Gottschalk, 1997; Friedman, 2000). So such a technical change would benefit those having higher human assets and they will experience higher incomes in later periods.

Permanent income hypothesis takes the assumption of income shocks as being serially independent. As a result of which household incomes regress to expected income level the subsequent period (Friedman, 1957). A weaker version of the theory, however, allows transitory shocks to be partially correlated and hence incomes are gradually regressed towards their mean. Conclusively, the theory states that those households which experience low reported income are more prone to negative transitory shocks in the base year and as they recover they are seen to experience a comparatively larger income gain. Moreover, if long-term income changes more than income shocks, these shocks will promote the negative relationship between reported base year income and the changes in income in the following years. On the contrary, there are theories which support the view that those having lower initial incomes will experience greater advantage in terms of increased incomes.

Heckscher–Ohlin framework theorizes that with the advent of increased international trade countries experience higher returns on those factors in which they are relatively abundant. Hence

a period of increased trade will benefit households which have low level of human and physical capital (Field et. Al, 2003). Moreover, country's own political conditions like pro poor growth policies can benefit individuals with low initial incomes and vice versa.

Galton (1889) proposed that the individuals who begin with above grand mean will have a downward convergence while those starting with below grand mean will end up with a relatively upward convergence. His idea was interpreted economically by Solon (1992) and Zimmerman(1992) meaning that those who possess highest incomes will be the least gainers when there is higher economic growth and will be the biggest losers in terms of income when there will be negative income growth. Stokey (1998) also pointed that mobility is an important concept to study not because it contains some intrinsic importance but because it is believed to help relieve the disparity in initial endowments, future prospects of income and initial endowments.

In addition to these there are two more theories which define the relationship between actual base year income and subsequent incomes. Transitory shocks which may build and persist by themselves are another phenomenon which can lead to gain or loss of physical, social or financial capital. Particularly those households who have unstable income equilibrium, income shock can drive them towards steady incomes. These multiple-equilibrium models favor the idea of poverty trap i.e., households whose incomes fall below a threshold point get trapped in poverty (Nelson, 1956; Galbraith, 1979; Schultz, 1980; Banerjee and Newman, 1993).

Whether income mobility is good or bad is not clearly defined (cf. Atkinson, Bourguignon, and Morrison, 1992). Those who favor income mobility argue that it boosts both equity and efficiency by providing economic incentives. Peter Hart in 1981 expressed it as: "It is mobility which

provides sticks for those who do not wish to move down the distribution and carrots for those who wish to move up". Milton Friedman (1962) pg. 171 opined in *Capitalism and Freedom* as: Inequality can be categorized into two main types as short run inequality and long run inequality based on income distribution. If we compare two societies, one which is highly mobile with families undergoing high changes in incomes during the years and the other in which there are no substantial changes in incomes in years then the latter will be experiencing more inequality. So in the first society, inequality provided a chance for the change, provision of opportunities and social mobility while the second is merely the static one reflecting a particular status. It emphasizes the importance of distinguishing between the two types mainly because competitive free-enterprise capitalism has the potentials to substitute the two for each other.

Aaberge et al (2002) have given arguments in favor of income mobility. They were of the view that:

- i) Mobility incorporates flexibility and efficiency in the economy by efficient allocation of labour resources.
- ii) Secondly in a society having high mobility, future actions of the individual play a relatively more important role in defining the economic status rather than the previous income. This is also called the opportunity argument, which serves as an important segment of the traditional liberal definition of justice. It reflects the idea of just society where individuals hold equal possibilities by birth.
- iii) Thirdly, income mobility works as an equalization of income over time so it lessens the need of yearly income distribution. Bergstrom and Gidehag (2001) have also remarked that when the economy incurs income mobility, income redistribution

mostly takes place by itself and as far as income variations are concerned, they can be dealt through insurance programs.

There are two main arguments which are against income mobility:

- i) One argument is that total income may not necessarily be the only indicator of social welfare during the period of study. Shorrocks (1978) expressed it as; “it seems likely that individuals are concerned with both the average rate of income receipts and the pattern of receipts over time”. It means that the patterns of income profiles may be the defining factors of welfare. *Ceteris paribus*, individual may possibly and probably prefer constant growth of income rather than a fluctuating one.
- ii) The second idea which opposes income mobility criticizes the third argument in favour of mobility discussed above. It says that income mobility does not essentially completely measure inequality. Income mobility can result in more instability for the individual and his/her household. If the transfer income is costly between individuals and if there exist uncertainty about future then surely the income the individual receives in a period will define his/her welfare. Amratya Sen has regarded cross-sectional and life time inequality as being supplements of each other and being the components of the same concept. Income mobility does not necessarily change the economic status of the individuals as well. This may risk the individuals moving out of poverty become poor again.

Here, in this study the analysis is performed to see if the poor are benefitted more than rich and is the theory of cumulative advantage or the supporting one holds good in rural Pakistan. Moreover, the determinants of mobility are also studied.

## *Chapter 4*

### **Data and Methodology**

The chapter studies the data sources used to compute the variables of interest, its limitations and the methodology used to study the mobility.

#### **4.1 Data**

Data used in the study comprises of panel households from the two waves of longitudinal survey namely “Pakistan Rural Household Survey” (PRHS) and “Pakistan Panel Household Survey” (PPHS) conducted in the years 2001 and 2010 respectively by Pakistan Institute of Development Economics. The analysis is restricted to rural households of the four provinces only as the first wave of panel survey- Pakistan Rural Household Survey (PRHS) - does not cover urban households.

##### **4.1.1 Districts and Primary Sampling Units in the Surveys**

PRHS- 2001 comprised of a total sample size of 2721 rural households with no inclusion of urban households. However, PPHS-2010 covered 1342 urban households and 2800 rural households from all the four provinces making a total sample of 4142 households. The sample of Panel households which could be drawn from the two surveys was of 2198 households with the remaining 602 households being the split households.

The PRHS-2001 was conducted in 2001 in 16 districts from the four provinces. The selected districts from KPK were Dir, Mardan and Lakki Marwat. From Sindh Larkana, Naabshah and

Mirpurkhas were included. From Baluchistan, the selected districts were Gawadar, Khuzdar and Laralai. In Punjab, Faisalabad, Attock, Vehari, Bahawalpur, Muzaffargarh and Hafizabad were included to effectively cover southern, central and northern Punjab. Overall the survey provides a good sample for effective representation of the rural areas of Pakistan. Pakistan Panel Household Survey PPHS -2010 comprises of the same districts for the rural areas but with the addition of urban sample for the same districts as well. However, we are concerned with Panel analysis, hence; urban households are not included in our study. Table-1 gives a view of the sampling districts and their primary sampling units which are village or deh in the district surveyed.

Attrition rate was found to be about 20% between the two periods of 2001 and 2010 (Nayab and Arif ,2012). The key reasons for the dropout from the sample were the refusal of the individuals to stay anymore as a part of the panel or leaving the original sample for a number of reasons like geographical movement to other place. However, attrition bias is believed to be non-significant, if there is no systematic dropout of the participating individuals i.e., if the attriting individuals do not possess any distinctive characteristics. Thus the only result is the decrease in the size of the sample between the waves (Nayab and Arif, 2012) examined the attrition bias in the panel survey and found it to be non-significant. Those who moved out were not tracked for their economic outcomes. This is another rationale to choosing households in order to get an accurate snapshot of changes in economic status instead of individuals which could provide us incomplete and biased picture of income changes.



**Table:1 Districts and Rural PSUs Covered in PRHS-2001 and PPHS 2010**

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<b>Province</b>	<b>Districts</b>	<b>No of Rural PSUs</b>
Punjab	Faisalabad	16
	Attock	4
	Hafizabad	4
	Vehari	4
	Bahawalpur	7
	Muzaffargarh	4
	Sindh	Nawabshah
Sindh	Larkana	7
	Badin	3
	Mirpur Khas	4
	KPK	Lakki Marwat
Balochistan	Mardan	7
	Dir	11
	Gawadar	7
	Khuzdar	7
Balochistan	Loralai	7
	Total	141

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Source: PRHS-2001 and PPHS-2010

## 4.2 Sample Size and Variables of Interest

Studies conducted to find out mobility are crucially dependent on the definition of the variables. Initial income and employment are found to have the largest impact on changing incomes (Fields et al., 2003b). The importance of demographic composition, education and employment is reported in a number of mobility studies as well as the ones which attempt to analyze transient and chronic poverty, in Malaysia, rural China and Chile (Nee, 1994; McCulloch and Calandrino, 2002; and Fields, 2001).

In our analysis we use the data from the two waves of panel survey namely PHRS-2001 and PPHS-2010. The study has used the micro-data of 2020 panel households. The information on income of the households is not easily comparable in the two surveys. Moreover, self-employment is not easy tractable hence; we use expenditures as proxies for incomes. The variables used in the study and their descriptive statistics are given in the Tabel-2. It gives the mean, standard deviation, minimum and maximum values of the variables used in the model. Variables of 'initial conditions' are the figures of 2001 while the difference between 2010 and 2001 values is representing the change variables. The first difference variables of demographic composition are logically exogenous to dependent variable hence included in the model. Change variable of share of employed is not included due to inability in the comparison of variables in 2001 and 2010 particularly pertaining to data limitation. First difference of physical assets however, can prove to be endogenous and excluded from the model.

Given below are the variables which are used in the study.

## **Expenditures**

Food and non-food items of the two panel surveys were taken for analysis. For missing prices mean prices of tehsil and district were incorporated

## **Household Size**

Household size is the number of individuals of the household. Household is defined as comprising of all the members of the immediate family who normally live and eat their meals together in the same dwelling.

## **Age of Household Head**

Each household member is assigned a different identity. Head of the household is identified by a separate code in the surveys. The completed years of age as reported by the respondents at the time of interview makes the variable “age”.

## **Share of Males**

No. of males are extracted by the respondents’ response to the question about sex. Shares are calculated by dividing the no. of males in a household by the household size.

## **Share of Females**

No. of females are extracted by the respondents’ response to the question about sex. Shares are calculated by dividing the no. of males in a household by the household size.

### **Share of Children**

Share of children is the number of individuals who are below 18 years of age divided by total household size.

### **Share of Employed Members**

Employed members of the household are computed by those who have affirmative response to the questions asked about working in the farm, entrepreneurial or non-farm activities. Their shares are calculated by dividing the employed members to the total number of households.

### **Education of Head**

Head education is calculated by the head's response to the question about the highest class attended in the school. Education is then categorized into three groups. Three categories were incorporated i.e., below matric, matric and above matric.

### **Land Owner**

Land owners are categorized into 3 groups defined as small, medium and large landowners. Small land owners are those who have land less than 3 acres. Medium land owners are those who have land between 3 and 10 acres. Large land owners are those who have above 10 acres of land

## **4.3 Equivalence Scale**

The choice of appropriate equivalence scale is a debatable assumption due to conceptual difficulties that are posed in the identification of suitable equivalence scales [Deaton and Paxson 1998]. Its selection depends on the assumptions regarding economies of scale, data limitations, decision about what are the different needs of the individuals and conventions to make the results

comparable (OECD,(n.d.); Rio Group, 2006; Coulter, Cowell & Jenkins, 1992;). The choice of equivalence scale is crucial because it influences the results like the poverty level, number of individuals affected by poverty and comparison of results of different countries.

Literature finds no consensus on the way to account for economies of scale. Hence, we turn to simplest and most popular method which is the one used frequently in poverty studies in Pakistan. Children under 18 years of age are given weighted scale of 0.8 while members of the household equal to the age of 18 years and above are weighted as one. These weights were used by Government of Pakistan to measure poverty levels. This also makes the study effective to make poverty analysis, comparisons and future research.

#### **4.4 Measuring Mobility**

For any study on income mobility the basic idea is to track the income distribution of the same individuals or households of the same society or different societies. The concept of income mobility is multifaceted; therefore, any measure which claims to cover all aspects of income mobility may be destined to criticism. There are different ways devised to measure mobility each of which has focused on different concepts of mobility (Fields et al., 2002, Checchi and Dardanoni, 2003). There have been at least 20 measures of mobility used in the literature. Ayala and Sastre (2007) find that “Cross country income mobility comparisons largely depend on the type of indices used”. Each mobility measure focuses on “different underlining entities” (Fields, 2007) hence it’s of extreme importance to adopt those indexes of mobility which define and elaborate the specific concept which is being focused in the study. Mobility indices are built on five different types of mobility movements; as categorized by Fields (2008); these are time

movement<sup>1</sup>, positional movement<sup>2</sup>, share movement<sup>3</sup>, non-directional/symmetric income movement<sup>4</sup>, directional income movement<sup>5</sup>, and income movement which consider inequality<sup>6</sup>.

Moreover, different measures have been constructed for defining the relationship between inequality and mobility (Shorrocks 1978, Maasoumi, 1998 and Fields and Ok, 1999) and evidently each measure draws different results and conclusions.

Fields and Ok 1996 gave the properties of a consistent mobility indicator. These are translation invariance, normalization, weak decomposability, strong decomposability, linear homogeneity, growth sensitivity, individualistic contribution and population consistency.

When analyzing poverty or income mobility there are three dimensions which have to be specified. The first is the metric or unit used for the measurement of welfare. Commonly used metrics include income, consumption, expenditures, health, assets, or more broadly functioning and capabilities. The second dimension is temporal that is the time period over which change in the metric is analyzed. The data used can be static drawn from a single cross-section or longitudinal data that track the unit of observation (individuals, households or family) over time. The third dimension is the technique used to sum up these measures over the population of interest.

For this study, the unit of analysis is the household. As incomes and expenditures are mostly shared by members of the family, so household income will provide with additional relevant information on defining the relationship between income differences and mobility. Moreover, the survey comprised of a number of individuals which moved in and out i.e., the attrition rate was large and the income outcomes of those individuals were unobserved. Hence, in order to present

a more accurate snapshot of the income changes households were analyzed by their income levels.

The metric used is adult equalized net expenditures. In developing countries, studies on economic dynamics look at both household consumption (Grootaert, et al. 1997, Glewwe and Hall 1998, Dercon and Krishnan 2000, Maluccio, Haddad, and May 2000) as well as income (Dreze, Lanjouw, and Stern 1992, Gunning et al. 2000, Fields 2003). Although life cycle model theorizes that the consumption is not evolved through “the temporal pattern of life cycle income” and resultantly anticipated income changes have no impact on consumption pattern. On the contrary, the empirics suggest that consumption follows the income tracks closely over life-cycle (Deaton (1992)). Expenditures are better variable to study while doing long run analysis as reflecting wellbeing or permanent income of the households; as households undergo consumption smoothing and do saving or dissaving to cope up with changing incomes (Deaton,1997).Expenditures are also clearly preferred unit of measurement if incomes are erratic like in case of poor who have particular set of items to make expenses on and there can be fairly large amount of measurement error because erratic incomes are difficult to recall and tend to be understated (Deaton 1997, Klasen 2000).

#### **4.5 Single Stage and Two Stage Index**

Mobility is measured using the concept of single-stage and two-stage indices given by Cowell and Schluter (1998b). Single-stage indices measure absolute mobility by considering the entire distribution in the years under consideration, while two-stage indices rank individuals into income groups which are either endogenously determined e.g., quintiles or exogenously fixed and then examine the mobility of these income groups. Single-stage indices consist of measures

like Shorrocks's rigidity index, King's measure, the correlation coefficient of incomes between periods and Fields and Ok's measures (Fields, 2001; Cowell and Schluter, 1998a). These indices consider the entire distribution for the measurement of mobility. The drawback, however, is that they are susceptible to measurement error particularly when only there are two waves of data to be used for the study. Shorrocks's rigidity index- a comparison of the Gini of the income in two periods ( $G(x + y)$ ) with the weighted average of Gini in each period- is used to find income mobility as it is found to be least sensitive to measurement error when Gini coefficient is used as a measure of inequality (Cowell and Schluter, 1998a).

#### **4.5.1 Shorrocks Index**

There has been extensive literature on income dynamics which has focused on the phenomenon that how mobility has worked as an equalizer for the society and to further measure the prevalence of permanent inequality in economies. Most of these studies had worked on cross section data to find different measures to compute inequality using incomes in long run. For this purpose the methodology which is mostly used is Shorrocks index. In 1978 Shorrocks for the first time proposed the existence of a link between mobility and inequality and constructed an index to measure intra-distributional mobility (Shorrocks, 1978b).

Shorrocks (1978) suggested the definition of mobility as: "In essence, mobility is measured by the extent to which the income distribution is equalized as the accounting period is extended" (Shorrocks, 1978).

Shorrocks index provides a link between inequality and income mobility and finds the extent to which income mobility plays its part in bringing equality through an "adjustment of inequality for mobility" index (R) by making a comparison of the average income in the study period with



the average inequalities of the observations under study. Mobility is measured by the amount of relative decrease in the weighted average of single year mobility when the accounting period is extended. So according to Shorrocks there is no mobility if the annual income shares of the individuals or in other words relative incomes are constant over time.

This study takes a slightly different approach to define mobility. Here “no mobility” takes place if annual rankings of all the individuals are constant over time. So by this definition if relative incomes change over time still there can be no mobility. So this definition allows the use of Gini coefficient to measure mobility. This approach is analogous to Shorrocks index with a slight difference however. For example if there is no change in income rankings say over s consecutive years but there is a change in the relative incomes of some units over time the Gini based index shows no mobility whereas Shorrocks index shows that income mobility has taken place.

$$R = \left( \frac{G(x + y)}{\mu_x G_x + \mu_y G_y / \mu_x + \mu_y} \right)$$

where R is the Rigidity Index measuring mobility,  $G_x$  refers to the Gini and  $\mu_x$  to mean income in the first period while  $G_y$  is the Gini  $\mu_y$  the mean income in the final period. A value of one would mean no mobility at all, while 0 would indicate perfect mobility. Clearly, the smaller value of R would indicate higher mobility. R can be taken as a measure which gives the extent of “permanent inequality”. A higher value of R would indicate the there is a larger permanent component of inequality measures.

The value of R depends on the measure of inequality through which it is calculated. The Gini inequality index measures the differences in incomes between observations in the middle of the distribution while the coefficient of variation or the Theil index are more sensitive to differences

at the top of the distribution relative to differences at the bottom or the middle. The reason for the difference is the use of different variables i.e., household income and mean household income in the computation of these indices. The value of R using the Gini should then be higher than those obtained using other indices.

Bjorklund (1993) used the Shorrocks index in order to measure income mobility, while Gustafsson (1994) measured income mobility by means of the Gini coefficient. Burkhauser and Poupore (1997) used both the Gini and Theil index of inequality to measure mobility. Shorrocks Index gives an assessment of mobility by taking into consideration the income of all the households in the distribution. However, it has a limitation of not clearly defining where mobility has taken place in the distribution. It does not distinguish between equalizing and disequalizing changes in the distribution. It was pointed out by Benabou and Ok (2001) and explained later by Fields (2007). Hence, this measure is often accompanied with transition matrix or other indicators of mobility to give a more clear analysis of mobility (OECD, 1996).

#### **4.5.2 Transition Matrix**

Cowell 1998 suggested the use of two stage indices in case there is presence of data contamination like misprints in values. For two-stage indices the measure used to compute mobility is transition matrix. For a transition matrix, the data are divided into endogenously determined income groups of equal sizes (for example, deciles or quintiles). The units experiencing a change in income groups will be referred to as ‘mobiles’ while those who experience no change will be called ‘immobiles’. Among the mobiles who move to a higher rank will be called ‘Winners’ and those who move to a lower rank will be called ‘Losers’ (Woolard and Klasen, 2005). The transition matrix has got an advantage that it can comprehensively

recapitulate mobility at various points in the distribution which is harder to gauge from a single index. Secondly, it is proved to be more robust to measurement error (Cowell and Schluter, 1998a).

The limitation, however, is its inability to capture the mobility within the brackets (Fields and Ok, 1999). Floor and ceiling effect is also disadvantage of the transition matrix. That is, the movement of individuals below the bottom and above the top income group cannot be observed. However, middle groups can give a true picture of mobility.

Another limitation is the possibility that the income mobility may be over-estimated in the country where there is low inequality i.e., it is sensitive to the level of inequality of the country whose mobility is calculated .For example in a country 20% change could represent income mobility as a result of change in quintile while in the other it could lead to no change in income bracket. The transition matrix is a commonly used measure to compute income mobility because it gives a comprehensive analysis of mobility. Among other studies, Gittleman & Joyce (1999) and Hungerford (1993) used transition matrix.

In order to overcome these limitations and have a comprehensive picture of mobility the absolute mobility is also measured.

#### **4.6 Univariate Regressions**

A number of studies can be found on exploring the question if households with initial poor status get ahead more or less than those who are rich. This question is explored mainly by finding the convergence or divergence of household economic wellbeing towards or away from the mean where the economic wellbeing is either expenditure or income on level or in logarithmic form.

The measure to find this convergence or divergence is by regressing the change in economic wellbeing ( $\Delta Y$ ) on base year economic position ( $Y_1$ ) with no other variables present.

A slope less than zero mean that there is convergence towards mean while greater than zero means divergence. Negativity of slope can be witnessed in several countries e.g., United Kingdom (Creedy and Hart, 1979; Thatcher, 1971), the United States (Moffitt and Gottschalk 1995), and Côte d'Ivoire (Grootaert *et al.*1997), which shows convergence in these cases. In France also (Hart 1976) found convergence between 1963 and 1966. Fields (2003) considered four countries and showed that households with lower reported incomes experienced more favorable changes in incomes and this relationship got stronger when logs were used for income and income changes. However, for predicted incomes there were mixed results with income showing convergence in Venezuela and divergence in Indonesia. For South Africa and Spain the base year predicted incomes were insignificant. In log units, there was convergence for predicted base year income in all the four countries.

The analysis is conducted on change in change in adult equivalent expenditures in both level and logarithmic form (real in both cases). Analyzing changes in expenditures on level is more traditional, and compute absolute income gains while change in log of expenditures reveals percentage change in expenditures. Using changes in logs is consistent with the widespread belief in concave utility functions – that a given increase in expenditures increases welfare of a poor household more than that of a rich household. In all cases, expenditures are measured in inflation-adjusted terms. The same is repeated for predicted base year incomes. The results for univariate regressions on our data are given in Table 5 and will help to find out if the theory of cumulative advantage and the supportive theories hold true in case of rural Pakistan or not.

## **4.7 Welfare Approach to Income Mobility**

There is an extensive amount of literature on welfare approach to income mobility. In this context mobility is taken in terms of the implications it holds rather than understanding of the mere concept of income mobility (Atkinson, 1981). For some it incorporates the idea of equalization of resources. According to Markandya (1982, p.457) it helps society to get rid of social impediments which restrain them from fulfillment of their economic role to their best using their natural abilities and social privileges which does not allow the selection of people best fitted to their roles.

### **4.7.1 Modeling Determinants of Welfare Change: Multivariate Analysis**

Income mobility is the sole indicator of income dynamics of individuals which is discussed widely in public policies. It indicates the opportunities a society can afford to move from its origin as well as the vulnerability to economic conditions.

Since individual utility is measured by consumption so we estimate the correlates of income change by multiple regressions. The underlying assumption of this model is that household income is a function of household assets (both physical and human) and the economic environment in which these assets can be utilized to generate income. In addition, the wellbeing of individual household members will depend additionally on the number of people who have to share these assets and the incomes derived from them. Log of the consumption variable for the year 2001 and 2010 is taken. Change in logs goes with the idea of concave utility functions which posit that as the income increases with the fixed amount economic welfare of the poor households rises more than richer ones. Values are realized for the effect of inflation.

Consequently, the dependent variable in this model is change in the real adult equivalent consumption between the periods under study. Suppose  $y$  denotes the adult equivalent income of household  $i = 1, 2, \dots, N$  in period  $t = 1, 2$

The equation used for regression analysis is used by Fields et al. (2003b) and is the modified version of Duncan's (1983) model of the determinants of the natural logarithm of family income:

$$\ln(AEY_i) = \beta_t X_{it} + \gamma_t Z_i + \delta_i + \varepsilon_{it} \quad (1)$$

$$\varepsilon_{it} = \rho \varepsilon_{i,t-1} + \mu_{it}, E[\mu_{it}] = 0, \text{Var}[\mu_{it}] = \sigma_n^2$$

$$\delta_i = \lambda Z_i + v_i, E[v_i] = 0, \text{Var}[v_i] = \sigma_v^2$$

where

$AEY_i$  = real 'adult equivalent' income of household  $i$

$X_{it}$  is a vector of time-varying characteristics of household  $i$  in period  $t$  and

$\beta_t$  is the corresponding coefficient

$Z_i$  is a vector of time-invariant characteristics of household  $i$  and  $\gamma_t$  is the associated parameter

$\delta_i$  stands for unobservable time-invariant family characteristics

And  $\varepsilon_{it}$  is serially uncorrelated error term

Subtracting  $\rho Y_{i,t-1}$  from both sides of equation (1), we get:

$$\ln(y_{i,t}) - \rho \ln(y_{i,t-1}) = X_{i,t} \beta_t - X_{i,t-1} \rho \beta_{t-1} + Z_i (\gamma_t - \rho \gamma_{t-1} + \lambda(1 - \rho)) + \omega_{it}$$

After adding  $\rho Y_{t-1}$  and  $-Y_{t-1}$  to both sides and rearranging

$$\ln(y_{i,t}) - \ln(y_{i,t-1}) = \Delta X_i \beta_i + X_{i,t-1} \tilde{\beta}_t + Z_i \tilde{\gamma}_t + (\rho - 1) \ln(Y_{i,t-1}) + \omega_{it}, \quad (2)$$

Where

$$\Delta X_t = (X_{i,t} - X_{i,t-1})$$

$$\tilde{\beta}_t = \beta_t - \rho \beta_{t-1}$$

$$\tilde{\gamma}_t = \gamma_t - \rho \gamma_{t-1} + \lambda(1 - \rho)$$

$$\omega_{it} = (1 - \rho)v_i + \mu_{it}$$

Equation (2) is of the form  $\Delta Y = f(X_1, \Delta X, Z, Y_1)$

Here  $\Delta Y$  denotes the change in adult equivalent income.  $X_1$  represents time-varying characteristics like household size, share of children, share of women and share of men and share of employed.  $\Delta X$  shows change in household size, change in share of children, change in share of males, change in share of females. Change variables of physical assets, and employment are not included.  $Z$  is a vector of time in-varying characteristics like education of head, head's age.  $Y_1$  is the variables of base year expenditures.

When eq (2) is estimated using reported initial income, measurement error in initial income can induce both a spurious negative correlation between initial income and income change Fields *et al.* (2003a, b). Consequently, IV estimation is also performed using an additional set of identifying instruments to predict true initial income. Fields *et al.* (2003a, b),

$$\ln y_{i,t-1} = \beta_{t-1} X_{i,t-1} + \gamma_{t-1} Z_i + k_{t-1} w_{i,t-1} + \delta_{it}$$

where  $w_{i,t-1}$  is a set of instruments. In choosing instruments, we are guided by Fields et al. (2003a, b; 2003) and rely particularly on headship and family characteristics and household assets.



## *Chapter 5*

### **Results and Interpretation**

This chapter discusses the results and interpretation of mobility measures. Firstly, the descriptive statistics of the variables used in the study are provided. The next segment comprises of the computed Gini Indices and the Rigidity Index. Mobility matrices are constructed in the next segment and the movement of the households in the quintiles is discussed. Lastly, regression analysis is made and variables are studied for their impact on changing incomes.

The summary statistics of the variables used in regression analysis are discussed in Table-2 below. In 2001, the average household size was 8 individuals with each household comprising of one-third of the children, and equal proportion of males and females. Each household comprises of one-third of the individuals who are employed. Head education is categorized into three groups below matric, matric and above matric level. Below Matric are those who have attained education anywhere from class 0 to 9<sup>th</sup>. Matric group are those who have attained education of 10<sup>th</sup> class. Above matric are those who have attained education above secondary school. Land owners are categorized into 3 groups defined as small, medium and large landowners. Small land owners are those who have land less than 3 acres. Medium land owners are those who have land between 3 and 10 acres. Large land owners are those who have above 10 acres of land. As far as change variables are concerned, the study included first difference variables of demographic composition as they are exogenous to the dependent variable. We witness a fall in household size and share of children and males with a little increase in shares of females.

**Table 2: Mean and Standard Deviation of the Variables Used in the Model**

<b>Rural Households of Pakistan</b>				
	Mean	Std dev.	Min	Max
<b>Expenditure Variables</b>				
Change in ln (adult equivalent expenditure)	0.122	0.92	-4.2	3.01
ln (adult equivalent expenditure 2001)	8.91	0.69	6.63	12.9
Adult Equivalent Expenditures	10333.23	19917.51	757.353	117927.5
Change in Adult Equivalent Expenditures	146.3801	21313.2	-41158.5	63303.77
<b>Human Capital Variables</b>				
Household Size	8	7.3	3	42
Share of children in household	0.4	0.22	0	0.8
Share of female adults in household	0.43	0.19	0	1
Share of male adults in household	0.50	0.19	0	1
Average years of education of household head				
Under Matric	0.88	0.31	0	1
Matric	0.66	0.25	0	1
Above Matric	0.045	0.21	0	1
Age of household head	46	15.48	1	99
Age Square of household head	2350	1539	1	9801
<b>Physical Capital Variables</b>				
Land owner				
Small (upto 3 acres)	0.71	0.45	0	1

Medium(>3to 10 acres)	0.16	0.37	0	1
Large(>10acres )	0.12	0.33	0	1
<b>Labour Market Variable</b>				
Share of employed persons in household	0.28	0.24	0	0.89
<b>Change Variables between 2001 and 2010</b>				
Change in household size	-4.93	10.51	-81	27
Change in share of children	-0.07	0.28	-0.75	2
Change in share of female adults in household	0.02	0.21	-0.82	1.75
Change in share of male adults in household	-0.02	0.21	-1	1.25

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*Source:* Own calculations on PRHS-2001 and PPHS-2010 data

## 5.1 Gini Index and Rigidity Index

To find out the absolute mobility in Pakistan Gini Index is used and computed for the years 2001 and 2010. Table-3 gives the Gini index of expenditures for the years 2001 and 2010 and also for the average expenditures for these years and shows the Shorrocks' rigidity index which is calculated using the above formula. The Gini index for the year 2001 was 0.41 which has experienced a downfall in the year 2010 coming to the value of 0.38. These results are comparable to the Gini coefficient calculated by UNDP (2007) which was 0.31. World Bank (2008) gave a Gini of 0.3 for Pakistan. The rigidity index is 0.86 which is indicating pretty high mobility if the mobility pattern of industrialized countries like United Kingdom, US and Germany is considered where it sways around 0.95 (e.g., Eriksson and Pettersson, 2000; Jarvis

and Jenkins, 1998).The index is closer to countries undergoing structural shift like Spain in 1990s where its value was 0.9 (Canto´, 2000)

**Table 3: Rigidity Index using Gini Coefficient and Adult Equivalent Expenditures**

2001 Gini	2010 Gini	G (X+Y)	Rigidity Index
0.41	0.38	0.34	0.861

Source: Author’s own Calculation

## 5.2 Transition Metrix

For a more disaggregated look let’s look at the mobility through transition matrix approach defined using five quintiles. That is households are divided into five quintiles based on their consumption expenditures. The highest quintile represents the richest group while the lowest the poorest one. These arrays are then cross-tabulated. This matrix represents ‘relative’ income mobility because it shows how the households change positions in the income parade relative to each other rather than their absolute incomes per household. Here, complete immobility is defined as the case when the households hold the same quintiles in 2010 as they were beholding in 2001.

Table-4 gives the results of intra quintile mobility for 2001 and 2010 using transition matrix. Data is divided into five quintiles ranking one for poorest to five for the richest. Matrix shows

that the largest entries are in the (1, 1) cell which shows that 26 the poorest in 2001 are likely to stay in the same income quintile in 2010; 20 percent of households who had the highest income rank in 2001 stayed there in 2010 while 22 percent of them moved down to the 4th quintile. Table-4 shows that 20 percent of the poorest households moved up by one income group. The transition matrix suggests overall a high degree of mobility. Developing countries undergo more income mobility than the industrialized ones particularly the income groups at the bottom of the distribution (Fields, 2001; Dercon and Krishnan, 2000). They also favor the increase in mobility in most of the places. For example, there was increasing mobility in Peru based on expenditure data in the 1990s (Fields 2001). Rural China also experienced an increasing mobility in the 1980s generally in the low income end (Nee,1994).

**Table: 4 Mobility Matrix of Expenditures**

<u>Quintile in 2001</u>	<u>Quintile in 2010</u>					row(total)
	1	2	3	4	5	
1	26.24	20.05	22.52	11.39	19.80	100
2	19.06	20.79	17.82	23.51	18.81	100
3	19.55	23.02	17.82	20.54	19.06	100
4	17.08	17.33	19.08	22.52	23.27	100
5	18.07	18.81	22.03	22.03	19.06	100

*Source:* Own calculations on PRHS-2001 and PPHS-2010 data

### 5.3 Regression Analysis

Table-5 gives the results of univariate regressions. The first row shows that those households which had lower reported incomes in base year had enjoyed betterment in economic status. When taken in log, the second row shows that both the reported income and change in income maintained the negativity of their relationship. The bottom two rows demonstrate results using predicted initial income which is taken as a measure of long-term measure of initial period income. Initial income is predicted using demographic characteristics, age and education of head of the household, employment status of members of household and ownership of physical assets and land. The results remain unchanged in this case as well. Households having lower predicted incomes had higher economic gains and these results were maintained on level as well as in logarithmic form. Overall, there was a pronounced *negative* relationship between reported income and change in income, and the same negative relation was witnessed in predicted income case.

**Table: 5 Univariate Regression**

Dependent Variable	Base Year Expenditure	Coefficient	
Change in Adult Equivalent Expenditure	Reported Expenditure	-1.006***	Pro-poor
Change in Ln Adult Equivalent Expenditure	Reported Expenditure	-0.968***	Pro-poor
Change in Adult Equivalent Expenditure	Predicted Expenditure	-0.765*	Pro-poor
Change in Ln Adult Equivalent Expenditure	Predicted Expenditure	-0.909***	Pro-poor

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Author's own calculation

Note:\*, \*\*, \*\*\* stand for significant at 10 percent, 5 percent and 1 percent respectively.

Table-6 and Table-7 shows the regression results of change in log of household expenditures. Most of the initial conditions variables significantly affect the change in consumption. The regression results show a negative relationship between initial expenditures and change in expenditures. These results are replicated with instrumental variable regression. Hence, *ceteris*

*paribus*, a household which has higher expenditures will be prone to a fall in expenditures in the subsequent years. The expenditures of 2001 significantly affect the dependent variable and have a negative coefficient which shows that adult equivalent expenditures converge towards their mean. Therefore, a household is more likely to experience a fall in its welfare the higher it possesses expenditure level in 2001. This confirms that most of the households have high transitory component in their incomes and they are not able to smooth their consumption. These results also give the reason of high income mobility given above.

Results go with the ones for Indonesia, Spain, South Africa and Venezuela as computed by Fields *et al.* (2003a, b). These results contradict the theory of cumulative advantage saying that households with better incomes are more likely to have a positive income gain. These results also match the ones in case of rural China Zhang *et al.* (2007).

Among the demographic and human capital variables, household size is found to be negatively related to welfare. Hence the larger the household size the more difficulty it will have to face to improve economic condition. So the idea of economy of scale doesn't fit here very well. The share of children in household has a negative coefficient proving the fact that the household who have large number of children are prone to falling future incomes. The shares of males and females adults in household have a positive impact on welfare as they participate actively in farm and non-farm activities to increase household wellbeing. Among physical assets, the higher the area of the land a household owns the greater mobility it has witnessed in the following years. This variable is highly significant in both reported and predicted income case proving it to be an important determinant of changing incomes. The coefficients also have higher values with larger land category. It supports the fact that poor households have a greater difficulty in improving their welfare status. This favors the analysis that household with larger physical assets show



greater income mobility. This is particularly important in case of rural analysis as a higher proportion of households work in farm fields and has agriculture as their source of income.

Age of the head of the household shows a negative relationship with mobility. But this household characteristic is not significant in bringing change in incomes which means that age of head is not of considerable importance to bring positive change in income. (Fields, 2003; Woolard and Klasen, 2007). Given these results, a priority for future research is to better understand the underlying causes of changes in employment and sector.

Share of employed members in the household has a significant positive relationship with mobility. This is due to availability of better prospects of earning and mobility (Woolard and Klasen, 2007)

As far as the human capital variable, education of the head of household is concerned, matric and above matric education has a significant positive relationship with mobility when the reference category is below matric education. This supports the existing situation of employment, as matriculation is the minimum benchmark for most of the non-farm employment opportunities. In case of IV regression above matric is a significant variable which supports the above mentioned results. Rural households which consist of heads having higher education seem to be more mobile. They have a competitive advantage in labour market and stand on a higher chance of increasing earnings. Moreover, better educated heads can make better family decisions about effective utilization of resources; cope with changing circumstances, and better exploitation of income generating opportunities (Schultz's, 1975).

The share of children in household has a significant negative relationship to the income mobility. This again supports the fact that larger household having more children are prone to falling incomes and they hold less chances of moving to upper income cadres.

The share of males and females in household positively affect income mobility as most of the rural households are participants of farm activities which is a major source of income for these households.

The analysis includes change in demographic composition. Change in household size appears to have a significant negative relationship to change in expenditures. Same is the case with change in the share of children. However for change in share of males and females the results were not significant in instrumental regressions. These results suggest that reducing household size and birth rate can lead to higher mobility.

**Table 6: Determinants of Change in LN (ADULT EQUIVALENT EXPENDITURES), Reported Base Year Expenditures**

	Coefficient	Std error
Ln (adult equivalent expenditures 2001)	-0.98***	0.02
<b>Human capital variables</b>		
Household size	-0.05***	0.003
Share of children in household	-0.49***	0.09
Share of female adults in household	0.68***	0.13
Share of male adults in household	0.77***	0.13
Years of education of household head		
Matric	0.103**	0.05
Above Matric	0.24**	0.06
Age of household head	-0.006	0.005
Age Square of household head	0.00005	0.00004
<b>Physical Capital Variables</b>		
Medium Land Owner	0.13***	0.03
Large Land Owner	0.24***	0.04
<b>Labour Market Variable</b>		
Share of employed persons in household	0.17**	0.06
<b>Change Variables between 2001 and 2010</b>		
Change in household size	-0.05***	0.003
Change in share of children	-0.26**	0.06
Change in share of female adults in household	0.33**	0.009

Change in share of male adults in household	0.36***	0.009
Intercept	8.6	0.22
Adjusted R <sup>2</sup>	0.31	
Number of observations	2020	

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Author's own calculation

Note:\*, \*\*, \*\*\* stand for significant at 10 percent, 5 percent and 1 percent respectively.

**Table 7: Determinants of Change in LN (ADULT EQUIVALENT EXPENDITURES),  
Predicted Base Year Expenditures**

	Coefficient	Std error
Ln (adult equivalent expenditures 2001)	-1.36**	0.46
<b>Human capital variables</b>		
Household size	-0.05***	0.005
Share of children in household	-0.18**	0.13
Share of female adults in household	0.44**	0.19
Share of male adults in household	0.53**	0.20
Years of education of household head		
Matric	0.25	0.16
Above Matric	0.40**	0.19
Age of household head	- 0.01	0.01
Age Square of household head	0.00009	0.00009
<b>Physical Capital Variables</b>		
Medium Land Owner	0.15**	0.05
Large Land Owner	0.27***	0.07
<b>Labour Market Variable</b>		
Share of employed persons in household	0.09**	0.08
<b>Change Variables between 2001 and 2010</b>		
Change in household size	-0.05***	0.004
Change in share of children	-0.09**	0.09
Change in share of females	-0.005	0.137
Change in share of males	-0.05	0.139

Intercept	11.8	0.88
Adjusted R <sup>2</sup>	0.31	
Number of observations	2020	

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Source: Author's Own Calculation

Note:\*, \*\*, \*\*\* stand for significant at 10 percent, 5 percent and 1 percent respectively.

## *Chapter 6*

### **Conclusion and Policy Recommendations**

This study provides a preliminary and a deep insight into different measures of mobility and how it is affected by its various determinants in case of Pakistan by looking at the income movements of the people between 2001 and 2010. The analysis was made by looking at absolute mobility measure first. Shorrocks index was calculated to analyze the mobility in the whole income distribution of the sampled households in Pakistan. The rigidity index gave a value of 0.86 which shows a good mobility in case of Pakistan. Then the positional mobility was found through transition matrix approach. Income quintiles were constructed and intragenerational mobility was analyzed. Mobility was found to be high keeping the pace with the trends in most of the developing countries. Demographic variables like household size, share of children, share of males, share of females, education of household head and economic event i.e., share of employed were found to be important determinants of mobility. In addition to regression towards mean which was found to be an important factor in the facilitation of poor to improve their economic status, there were factors that prove to be an obstacle in the way of advancement of the poor. These were large initial household size, large share of children, less physical assets in terms of land and house ownership, lower or no education and low level of employment. These can prove to be the reasons of poverty trap and taper off the benefit of poor to start from lower levels of income. Hence, increase in education levels and employment levels and reduction in household size proved to be important areas to work on to improve the economic status of the people.

These findings emphasize the importance of improving education, increasing employment and population control policies. Establishment of efficient labour markets and reforms in education

policies is a must to do in order to witness higher income levels in rural Pakistan. There is also a need for land reforms as land is a major source of generation of income and it helps the rural households to improve their living status. However, concentration of physical assets in few hands can prove to be exaggerating inequality and hinder the way of economic mobility.

Intragenerational mobility is a hot issue among policy makers and researchers nowadays because of its emerging importance in tracking the effects of different policies at individual and household level. There may be different policies required to tackle different issues like persistent poverty, transient poverty or to improve the economic status of individuals.

Although this study provides a good insight into income mobility, its trends and its determinants but much needs to be done in future. A decomposition analysis can be made to find out the relative importance of each of the determinants of mobility. Furthermore a dynamic analysis of poverty can also be done to find out how the factors that hinder mobility are playing their role in the cause and persistence of poverty.



## Notes

<sup>1</sup>Mobility as time dependence takes into account the fact that how much individual current income depends on his/her past income. In an intergenerational context it means how much income of the preceding generation depends on the income of the previous generation. In an intra-generational context, mobility looks at how much present income of the individual depends on the previous income of the same individual. Measures used for time dependence are mostly Cramer's V or Pearson's correlation coefficient movements while others have calculated correlation coefficients of the base and final years (Atkinson, *et al.* 1992).

<sup>2</sup>Positional movement (or 'quintile movement') considers the movement of individuals among various positions (quintiles, deciles, centiles, or ranks) in the income distribution. There will be positional movement if and only if the individual changes quintiles, deciles, centiles, or ranks. So the greater the positional changes the larger the positional movement. Many studies have used the measures of mobility that have divided the income of base and final periods in quintiles (Fields, 2001). Quintile movements do not consider the changes within quintiles and changes in absolute income that cause a change in income quintiles and may provide wrong picture of income mobility. Jenkins and Van Kerm (2003) have divided income inequality trends into two components which are 'pro-poor income growth' component and an 'income mobility' component. In the measurement of income mobility there is consideration of ranks only. So they have taken mobility as a phenomenon of positional movement only.

<sup>3</sup>Share movement is also a relative movement. It measures the change in individual's share of total income. If the income of individual rises or falls relative to mean then share movement takes place. The average share movement always equals to zero and has no descriptive sense. However, the correlation between initial income share and final income share equals the

correlation between initial income and final income. So whenever correlation coefficient measures the income shares of initial and final time, mobility as share movement has also been measured. So share movement is independent of the fact that individual has the same income in terms of currency or if he or she has the same position in the income distribution. D'Agostino, M. and Dardanoni, V. (2005) have defined relative mobility as change in the relative status of an individual compared to others.

<sup>4</sup>Non-directional income movement also called 'flux' or symmetric movement measure the amount of change in individuals' incomes. For example if an individual in the distribution undergo an increase of 1000 dollars in his income and other person's income decrease by the same amount of 1000 dollars then according to non-directional income movement the average amount of change is 1000 dollars.

<sup>5</sup>If there is consideration of change as well as direction, this is called directional movement. It is usually measured by means of linear or concave valuation function. Fields and Ok (1996, 1999b) provide indexes for measuring symmetric and directional income movement.

<sup>6</sup>If change in inequality in the final years is considered relative to base years when the change in income is also accounted for, then this is called mobility as an equalizer of long term incomes (Schumpeter, 1955; Shorrocks, 1978b; Slemrod, 1992; Krugman, 1992; Jarvis and Jenkins, 1998). Only recently has a class of measures of this concept been proposed (Fields, 2005).

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